

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I**

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In the Matter of:

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) **U.S. EPA Region I**  
)

Training Range and Impact Area,  
Massachusetts Military Reservation

) **EPA Docket No.: SDWA-1-2000-0014**  
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)  
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National Guard Bureau  
and  
Massachusetts National Guard,

Respondents.

)  
)  
) **ADMINISTRATIVE ORDER**  
) **FOR RESPONSE ACTION**  
)  
)

Proceeding Under Section 1431(a) of the  
Safe Drinking Water Act,  
42 U.S.C. § 300i(a)

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ADMINISTRATIVE ORDER  
FOR: MASSACHUSETTS MILITARY RESERVATION  
TRAINING RANGE AND IMPACT AREA RESPONSE ACTIONS

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## I. JURISDICTION

1. This Administrative Order (Order) is issued to Respondents National Guard Bureau and the Massachusetts National Guard pursuant to the authority vested in the Administrator of the United States Environmental Protection Agency (EPA) by Section 1431(a) of the Safe Drinking Water Act (SDWA), 42 U.S.C. § 300i(a). The Administrator of EPA has delegated the authority to take these actions to the Regional Administrator of EPA Region I by EPA Delegation No. 9-17 (1200-TN-350) dated May 11, 1994.

2. In the interests of environmental protection, public health and welfare, EPA hereby orders Respondents to undertake all actions required by this Order. With respect to response actions to be conducted, Respondent Massachusetts National Guard shall only be responsible to assist NGB for Work under Section XVII (Access) and under Section XX (Creation of Danger, Emergency Response).

## II. STATE COORDINATION

3. Pursuant to Section 1431 of the SDWA, 42 U.S.C. § 300i, EPA consulted with the Commonwealth of Massachusetts and local authorities on this matter, to confirm the correctness of the information on which his action is based and to ascertain what actions they may be taking. EPA has determined that the Commonwealth of Massachusetts and local authorities have not by themselves taken the actions necessary to protect the health of persons who obtain drinking water from the Sagamore Lens. However, they will work with EPA under this order to protect such persons.

## III. PARTIES BOUND

4. This Order shall apply to and be binding upon the Respondents, and upon their affiliated organizations, agents, contractors, and consultants.

## IV. PURPOSE

5. This Order requires the Respondents to undertake Rapid Response Actions and Feasibility Studies, Design and Remedial Actions to abate the threat to public health presented by the contamination from past and present activities and sources at and emanating from the Massachusetts Military Reservation (MMR) Training Range and Impact Area. The required actions are described more fully in the Statements of Work (SOWs) attached to this Order as Appendices A and B, which are enforceable hereunder.

## V. DEFINITIONS

6. All other terms, not otherwise defined herein, shall have their ordinary meanings unless defined in SDWA, in which case the SDWA definition shall control.

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"Contractor" shall mean any person, including the contractors, subcontractors, or agents, retained or hired by Respondents to undertake any Work under this Order.

"Day" shall mean a calendar day, unless otherwise specified.

"Order" shall mean this SDWA § 1431 Administrative Order, any attachments or appendices to this Order, and all documents that are to be produced or submitted pursuant to this Order. All attachments or appendices to this Order, and all documents that are to be produced or submitted pursuant to this Order are incorporated into this Order, and shall be enforceable hereunder.

"Work" shall mean all tasks and activities required by this Order or related to the performance of tasks and activities required by this Order.

## **VI. FINDINGS OF FACT**

7. Respondent National Guard Bureau (NGB) is an agency of the United States. The National Guard Bureau oversees, provides funding for and sets requirements for training activities conducted by the Massachusetts National Guard at MMR.

8. Respondent Massachusetts National Guard, and its divisions, the Massachusetts Army National Guard and Massachusetts Air National Guard, are agencies of the Commonwealth of Massachusetts.

9. The Massachusetts Military Reservation (MMR) is a 21,000-acre facility located on Cape Cod, in the townships of Bourne, Falmouth, Mashpee and Sandwich in Barnstable County, Massachusetts. The Massachusetts Army National Guard and Massachusetts Air National Guard conduct operations at MMR, under the direction of the National Guard Bureau.

10. On July 13, 1982, EPA determined that the Cape Cod Aquifer is the sole or principal source of drinking water for Cape Cod, Massachusetts, and that the Cape Cod Aquifer, if contaminated, would create a significant hazard to public health. 47 Fed. Reg. 30282. Among the findings on which EPA based this determination are the following:

- a. The Cape Cod Aquifer is a single continuous aquifer, which then served as the "sole source" of drinking water for the approximately 147,725 permanent residents and 424,445 peak seasonal residents of Cape Cod;
- b. There is no existing alternative drinking water source, or combination of sources, which provides fifty percent or more of the drinking water to the designated areas, nor is there any reasonably available alternative future source capable of supplying Cape Cod's drinking water demands; and
- c. As a result of its highly permeable soil characteristics, the Cape Cod aquifer is susceptible to contamination through its recharge zone from a number of sources. Since

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groundwater contamination can be difficult or impossible to reverse, and since this aquifer is relied on for drinking water purposes by the general population, contamination of the aquifer would pose a significant hazard to public health.

11. Currently, the Cape Cod Aquifer serves as the sole drinking water source for approximately 200,000 permanent and 520,000 seasonal residents of Cape Cod.

12. A study conducted by the Defense Department's Joint Program Office at MMR in April of 1999 estimated that in the year 2020, there will be a water supply shortage of between 9.8 and 11 million gallons per day for the regional water supply, that is the combined supplies of Bourne, Falmouth, Mashpee, Sandwich, South Sagamore and for Otis Air National Guard Station, which serves all users on MMR.

13. Approximately 14,000 acres of MMR constitute the Training Range and Impact Area.

14. The Training Range and Impact Area lie directly over the Sagamore Lens, the most productive part of the Cape Cod Aquifer. The Training Range and Impact Area is a major groundwater recharge area, located near to the apex of the Sagamore Lens. Groundwater flows radially in all directions from the Training Range and Impact Area.

15. The Sagamore Lens has been identified by the Cape Cod Commission as the portion of the Cape Cod Aquifer most capable of supplying sufficient water to satisfy future demand for drinking water on Cape Cod. If MMR is excluded from the list of potential future water supply areas on Cape Cod, only approximately 5 percent of Cape Cod lies over groundwater which is suitable as a future water supply. If MMR is included in the analysis, approximately 19 percent of Cape Cod is suitable as a future water supply area.

16. The part of an aquifer that directly supplies a public water supply well is known as a "wellhead protection area". The Training Range and Impact Area lie directly above segments of several wellhead protection areas on Cape Cod.

17. For over fifty years, military and law enforcement training has been conducted in the Training Range and Impact Area, including training by Respondents. This training and associated activities has included, but has not been limited to:

- a. Small arms firing at several ranges in the Training Range and Impact Area involving the use of small caliber munitions;
- b. Artillery firing and mortar firing into the Impact Area from gun and mortar firing points located within and/or near the Training Range;
- c. Burning of excess propellant bags at firing ranges and gun and mortar locations;

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- d. Detonation practice for explosives at demolition ranges in or near the Training Range and Impact Area;
  - e. Detonation of unexploded ordnance (UXO) found in and near the Impact Area, including detonation of high explosive mortar and artillery rounds.
  - f. Training activities with various other munitions including pyrotechnic devices, rockets, grenades, and mines;
  - g. Packing, testing and development of weapons by Department of Defense contractors at ranges under lease from the United States Department of Army;
  - h. The disposal and abandonment of unexploded ordnance, partially exploded ordnance and used ordnance at various locations in and around the Training Ranges and Impact Area; and
  - i. The storage of munitions, including explosives, at Ammunition Supply Points.
18. On February 27, 1997, pursuant to Section 1431 of the SDWA, EPA issued Administrative Order SDWA I-97-1019, which required the National Guard Bureau to investigate contamination at and emanating from the Training Range and Impact Area.
19. On April 10, 1997, EPA issued Administrative Order SDWA I-97-1030, which required the National Guard Bureau and the Massachusetts National Guard to cease certain training activities pending the completion of environmental investigations at the Training Ranges and Impact Area. Administrative Order SDWA I-97-1030 was later modified on July 25, 1997.
20. Munitions and other materials used at the Training Ranges and Impact Area, both currently and in the past, contain hazardous constituents, including the compounds detected in groundwater and soil discussed in paragraph 39 below. A partial list of the munitions used at MMR and their components is contained in the Ordnance and Explosives Archive Search Report (Army Corps of Engineers, March, 1999), the Draft Range Use History Report (Ogden Environmental, June, 1997) and Draft Chemical Composition of Munitions Report (Ogden Environmental, June, 1997).
21. Munitions used by Respondents in artillery and mortar firing at MMR contained explosive compounds. High explosives used at MMR in the past for mortar, rocket and artillery firing and for grenades include trinitrotoluene (TNT) and Royal Demolition Explosive (RDX), hexahydro-1,3,5-trinitro-1,3,5-triazine.
22. TNT has been the most widely used military explosive since World War I.
23. RDX has been used since World War II, and is used in combination with TNT.

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24. Cyclotetramethylenetetranitramine, or octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, commonly known as HMX or High Melting Explosive, is an explosive that has been used at MMR in rocket propellants, grenades, Dragon warheads and in other munitions.
25. HMX is also contained in RDX as a manufacturing impurity.
26. Propellants that were used at MMR for artillery include single base propellants. The constituents of single base propellants include, among other things, dinitrotoluene (DNT), dibutylphthalate and diphenylamine. The isomers 2,4-DNT and 2,6-DNT are compounds that compose technical grade DNT.
27. One artillery propellant used at MMR was the White Bag M4 series. DNT and diphenylamine together account for 24% of the reported weight of this propellant.
28. Propellants that were used at MMR for mortar and rocket firing included double-base propellants, including M7, M8, and M9 propellants. Generally, double-base propellants include nitroglycerin as one of the constituents. Nitroglycerin and diethylphthalate together account for 46% of the reported weight of M8 propellants. M9 propellants also contain diphenylamine.
29. N-nitrosodiphenylamine is a combustion breakdown product of diphenylamine, a component of single-based and double-based propellants. It is also used as an intermediate in the synthesis of p-nitrosodiphenylamine, an anti-scorching agent, and has been found in soil and groundwater contamination at U.S. Army ammunition plants.
30. Munitions used by Respondents at MMR contained metals that have been found in soil in the Training Ranges and Impact Area, including lead, copper, barium, aluminum, magnesium, and cadmium.
  - a. The primary constituent of the small arms used by Respondents at MMR prior to 1997 was a lead core in a metal alloy jacket, usually composed of lead, copper, iron, antimony, nickel and barium.
  - b. Lead was also used in the primer of most small arms ammunition and mortars.
  - c. Copper was utilized for the shaped charge liner for Dragon warheads used at MMR, in addition to being used in small arms munitions.
  - d. Aluminum was used in 155mm smoke rounds, in the flash composition of artillery simulators, and in the flash composition of hand grenade simulators.
  - e. Magnesium was used as a tracer compound in 50 caliber ammunition, in the flash composition of hand grenade simulators and in pyrotechnics.
  - f. Cadmium was used in the coating and electroplating of steel, which is used in the production of artillery rounds and other munitions.
  - g. Arsenic was used in pre-World War II military pyrotechnics.
  - h. Barium, in the form of barium chlorate, barium nitrate, barium chromate, and barium peroxide, was used in military pyrotechnics, primers, and smoke compositions.



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31. Pyrotechnics were also used in training operations at MMR. Available information indicates that many of the pyrotechnics have hazardous constituents, including but not limited to contaminants detected in soil and groundwater in the Impact Area and Training Range.
32. Many pyrotechnics used at MMR contain hazardous constituents such as lead thiocyanate, nitroglycerin, diethylphthalate, hexachlorobenzene, magnesium, aluminum, and acetone.
33. Petachlorophenol, dieldrin, MCP and arsenic were common pesticides used during the period that Respondents used the Training Range and Impact Area for training exercises.
34. 1,2-Dibromoethane, or ethylene dibromide (EDB) is a component of leaded gasoline that was used at the Training Ranges and Impact Area until 1984.
35. The burning of energetics containing plastics and chlorine in the presence of diesel fuel and wood may produce dioxins and furans. In controlled studies, furans were detected in a simulated waste burn and dioxins were detected in a controlled burns of a flare (type M43A2), and a mixture of diesel fuel and dunnage (scrap wood from ammunition boxes, styrofoam packing materials and other combustible materials) typically disposed of through open burning.
36. Studies conducted at other firing ranges suggest that explosive and propellant contaminants migrate to groundwater. In a study conducted at a firing range at Fort Ord in 1994, the Army observed that the impact areas were contaminated with residues of high explosives, including HMX, RDX, TNT and TNT transformation products. In a subsequent study published in August of 1998, the Army's Cold Regions Research & Engineering Laboratory compared data from the 1994 study with data collected at the Fort Ord Ranges in 1997. The CRREL study concluded that levels of explosives contamination in soil had declined over the intervening three years and that it had likely migrated downward with percolating water to deep into the aquifer. Once dissolved in water, RDX is known to migrate rapidly in soils.
37. In a study conducted by CRREL at Valcartier Air Force base, although RDX was detected in soils at levels that were usually under 2 ppm, it was detected in groundwater at 46 ppb, well in excess of the EPA Health Advisory of 2 ppb.
38. Portions of the Training Ranges and Impact Area have been investigated for groundwater, soil and sediment contamination pursuant to EPA's Administrative Order SDWA I-97-1019. To date, this study has revealed that a number of areas in the Training Ranges and Impact Area have been contaminated by Respondents' disposal and training related activities. Contamination from explosives, propellants, metals, herbicides, pesticides, volatile organic compounds, semivolatile organic compounds and UXO have been discovered in soil and/or groundwater in numerous areas. Investigations regarding the nature and extent of contamination at the Training Ranges and Impact Area are ongoing.

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39. Information gathered to date under this study indicates that specific areas at or near the Training Ranges and Impact Area require response action, as described in Section X of this Order. The specific areas, and some of the levels of contamination detected, are as follows:

**A. Demolition Area I:** Demolition Area I, a training area used primarily for demolition, is located south of the Impact Area and north of Pocasset-Forestdale Road. Types of materials used for training purposes at this location included C4, TNT, dynamite, shape charges, cratering charges, bangalore torpedoes, claymore mines and detonating cord. This area was also used for open burn/open detonation disposal of munitions.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of Demolition Area 1 at concentrations in excess of EPA's Health Advisory for RDX of 2 ppb, as follows:

MW 19	260 ppb
MW 34	6.2 ppb
MW 31	370 ppb
MW 73	Over 2 ppb
MW 77	148 ppb

MW34 is approximately one half mile west of Demolition Area 1.

2,4,6-TNT has been detected in groundwater in MW 19 at Demolition Area 1 at 16 ppb, which is in excess of EPA's Lifetime Health Advisory for TNT of 2 ppb.

The following contaminants have also been detected in surface and subsurface soils at Demolition Area 1:

#### **Surface Soils:**

RDX	2,900 ppb
HMX	690 ppb
2A-4,6-DNT	800 ppb
4A,2,6-DNT	400 ppb
2,4,-DNT	1,800 ppb
2,6-DNT	40 ppb
Di-N-Butylphthalate	290 ppb
N-nitrosodiphenylamine	930 ppb

#### **Subsurface Soils:**

RDX	9,300 ppb
HMX	380 ppb
2A-4,6-DNT	360 ppb

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4A-2,6-DNT	340 ppb
2,4-DNT	150 ppb
Di-N-Butylphthalate	200 ppb
N-nitrosodiphenylamine	34 ppb

The contaminants found in soil and groundwater in and downgradient of Demolition Area 1 lie within the zone of contribution for active public water supply wells in Bourne, Massachusetts. A zone of contribution defines the land area from which groundwater flows into a drinking water well under pumping conditions. Contaminants in soil and groundwater in a zone of contribution may be drawn into a drinking water well.

The contamination in soils at Demolition Area has entered and is likely to continue to enter the underlying groundwater.

**B. Chemical Spill (CS)-19:** The CS-19 site is a small area in the west-central region of the Impact Area that was used for the disposal of munitions, among other things.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of CS-19, in excess of EPA's Health Advisory of 2 ppb for RDX as follows:

MW 25	4.1 ppb
58 MW 0002	20 ppb
58MW0009E	17 ppb

Contaminants have also been detected in surface and subsurface soils at CS-19, including the following:

#### **Surface Soils:**

HMX	2,713 ppb
diethylphthalate	14,000 ppb
Hexachlorobenzene	4,600 ppb
2,4-DNT	710 ppb
N-nitrosodiphenylamine	380 ppb
OCDD	3.5 ppb
Total Hp CDF	.38 ppb
DCDF	2.9 ppb
Total HpCDD	.31 ppb
MCPP	232,000 ppb
Aluminum	26,100 ppm
Lead	1,830 ppm
Magnesium	12,200 ppm

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#### **Subsurface Soils:**

HMX	789 ppb
Hexachlorobenzene	3,500 ppb
OCDD	1.9 ppb
Total HxCDF	.68 ppb
Total Hp CDF	.67 ppb
DCDF	3.9 ppb
Aluminum	9,050 ppm
Lead	1,500 ppm
Magnesium	2,100 ppm

Contamination in soils at CS-19 has entered and is likely to continue to enter the underlying groundwater.

The soil and groundwater contamination related to CS-19 lie within the zone of contribution for Long Range Water Supply 8, a potential water supply well site being investigated as a future public drinking water well.

**C. Southeast Corner of the Ranges:** This area is close to the top of the groundwater mound of the Sagamore Lens. Explosives have been detected in wells outside of the Impact Area north of Snake Pond close to the J Ranges. Explosives were disposed on the ground surface and into underground holding tanks.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of the J Ranges in excess of EPA's Health Advisory of 2 ppb for RDX as follows:

90WT 013	5.2 ppb
90MW 0022	5.4 ppb

HMX has been detected in a well installed near the melt-pour facility on the J-3 Range at 12 ppb.

Contaminants have also been detected in surface soils at the steel lined pit at the J Ranges including the following:

HMX	9,300 ppb
2,4-DNT	200 ppb
di-n-butylphthalate	80 ppb
pentachlorophenol	37 ppb
aluminum	24,600 ppm
lead	616 ppm

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magnesium	2,720ppm
barium	1,140ppm
copper	2,350 ppm
cadmium	33.3 ppm

Contamination in soils at the steel lined pit is likely to enter the underlying groundwater. The soil and groundwater contamination related to the J Ranges lie within the zone of contribution for Long Range Water Supply Wells 95-6 and 95-15, potential water supply well sites being investigated for future public drinking water wells. This contamination may also lie within the zone of contribution for the J Well, a current water supply well for MMR.

**D. Groundwater in and emanating from the Central Impact Area:** Numerous detections of explosives in groundwater at various depths in the aquifer track back to, or originate from, the center of the Impact Area. The Impact Area contains numerous target areas where mortar and artillery, including high explosive and white phosphorous warheads, were fired over time.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of the targets in the Central Impact Area at levels in excess of EPA's Health Advisory of 2 ppb for RDX, as follows:

MW-2	13 ppb
MW-23	4.7 ppb
MW-38	2.5 ppb
MW-1	2.5 ppb
MW-25	4.0 ppb
MW-40	2.8ppb
MW-37	2.9 ppb

MW-2 and MW-23 are located within the zone of contribution for Long Range Water Supply Well 95-6, a potential water supply well site being investigated for a future public drinking water well. MW-1, MW-25 and MW 37 are located within the zone of contribution for Long Range Water Supply Well 2, a potential water supply well site being investigated for a future public drinking water well.

RDX at levels below the Health Advisory of 2 ppb has also been detected at numerous wells within and downgradient of the Impact Area.

The detection of RDX emanating from the Impact Area at levels below and above the Health Advisory indicates that RDX has been introduced into the aquifer in the Impact Area, that it is migrating in groundwater at concentrations above the Health Advisory

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level from source areas toward potential drinking water supplies, and that it has migrated as far as 6,900 feet from its probable source.

In addition, the following contaminant has been found in surface soils in Study Area 2 within the Impact Area, which lies within the zone of contribution for Long Range Water Supply Well 95-6, a water supply well site being investigated for a potential drinking water supply well:

1,2-dibromoethane      190 ppb

The contamination in soils in Study Area 2 is likely to enter the underlying groundwater.

**E. The KD Range:** The KD Range is located southeast of the Impact Area, on Pocasset-Forestdale Road. Ordnance known to have been used at KD Range has included: all pistol calibers; 5.56 mm and 7.62 mm ball and tracer rounds; 14.5 mm subcaliber training devices; 40 mm High Explosive (HE) and practice grenades; Dragon High Explosive Anti-tank (HEAT) and practice artillery rockets, 90 mm recoilless rifle HEAT and practice rounds, and TOW practice rounds. The area was primarily used for rocket training.

The following contaminants, including but not limited to explosives and propellants, have been found in surface soil near targets used in the KD Range:

RDX	43,000 ppb
HMX	10,100 ppb
TNT	2,100 ppb
2A-4,6-DNT	220 ppb
4A-2,6-DNT	140 ppb
copper	1,820 ppm
lead	816 ppm
dieldrin	1,800 ppb
nitroglycerin	6,400 ppb

In profile samples collected during drilling, 2,6-DNT and HMX were detected in MW 61M at 10.2 feet below the water table and 20.2 feet below the water table, respectively. Consultants for NGB have concluded that shallow detections of 2,6-DNT and HMX in MW-61 are likely to have originated from the KD Range target area.

In addition, the following contaminant (a constituent of propellants) was found in surface soil near the firing position for the KD Range:

Nitroglycerin                      130,000 ppb

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Contamination in soils at the KD Range is likely to enter the underlying groundwater. The contaminants in soil at the KD Range are within the zone of contribution of current public drinking water wells of Bourne, Massachusetts.

**F. J-3 Wetland:** The J-3 Wetland is located south of the J-3 Range and north of Snake Pond. The property on which the J-3 Wetland is located was formerly part of the MMR.

The following contaminants, which include propellants and their byproducts, as well as the pesticide dieldrin, have been detected in sediment samples at the following levels at the J-3 Wetland:

Nitroglycerin	5,200 ppb
Di-n-butyl phthalate	37 ppb
N-nitrosodiphenylamine	240 ppb
Dieldrin	200 ppb

Contamination in soils and sediments at the J-3 Wetland is likely to enter the underlying groundwater.

**G. Gun Positions:** The following contaminants, which include propellants, propellant breakdown products, pesticides and metals, have been found in soils at the following gun positions:

**i. Gun Position 7**

2,4-DNT	1,300 ppb
2,6-DNT	26 ppb

**ii. Gun Position 16**

2,4-DNT	600 ppb
---------	---------

**iii. Gun Position 9**

2,4-DNT	17,000 ppb
2,6-DNT	960 ppb
N-nitrosodiphenylamine	930 ppb
Pentachlorophenol	180 ppb
Arsenic	17 ppb
Di-N-butylthalate	16,000 ppb

Contamination in soils at these gun positions is likely to enter the underlying groundwater.

**H. Armored Personnel Carrier:** The following explosives and explosives breakdown products have been found in soil beneath a pile of UXO and debris near the Armored Personnel Carrier to the east of Turpentine Road in the Impact Area:

**Surface Soils**

2A46 DNT	230 ppb
RDX	1,150 ppb
HMX	150 ppb

**Soils 6-12" below Surface**

2A46 DNT	155 ppb
RDX	565 ppb
HMX	150 ppb

The contaminants in soil at the Armored Personnel Carrier are likely to enter groundwater.

**I. Unexploded Ordnance (UXO) and Munitions:** Some military munitions employed on military ranges fail to function as intended, which can result in Unexploded Ordnance (UXO) remaining on the range. The generally accepted percentage of munitions that fail to function as designed is between 10 and 20%.

UXO can be located either on the surface, or if they were buried or fired, below the surface. UXO may pose a safety hazard and/or an environmental hazard.

UXO may leak propellant, explosive and pyrotechnic components to the environment.

i. As stated in Department of Defense's proposed rule to regulate Closed, Transferred and Transferring Ranges Containing Military Munitions (the "Range Rule"), propellant, explosive and pyrotechnic compounds in military munitions may be released to the environment when the munitions casing is damaged or deteriorated. 62 Fed. Reg. at 50800. According to the Draft Fate and Transport of Munitions Report prepared by the NGB for MMR, "undetoned explosive compounds contained in UXO have the potential to leach into the environment." (Ogden, June 1977). Metals from UXO can also build up over time in the environment.

ii. According to a military technical manual, shells containing TNT and Amatol can exude TNT even under the controlled conditions of above ground storage in an ammunition supply point. (War Department Technical Manual TM 9-1900, Ammunition-General)



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iii. A DOD Pamphlet entitled **Unexploded Ordnance (UXO): An Overview** states that “UXO may also be found in parts or fragments. All UXO, whether intact or in parts, presents a potential hazard because it may contain chemical agents that could become exposed.”

iv. Sandia National Laboratory’s fact sheet on UXO states that at number of its environmental restoration sites unexploded ordnance/high explosives may be present. “The UXO/HE found include high explosive chunks....[and] five-inch shells with recrystallized TNT seeping from threads....”

v. A June 1998 report prepared by the Department of Army Defense Ammunition Center on UXO exhumed from the J Range at MMR in December 1997 found the vast bulk of the exhumed ordnance to be “corroded” or “extremely corroded;” that much of the ordnance found presented “exposed filler”; and that one 155mm round presented exposed RDX to the environment. This was a low order detonation which, in the report’s words, resulted in “open projectile. Dirt in Body.”

vi. A March 1999 report prepared by the Army Corps of Engineers states that “virtually every type of OE (live ammunition or components, debris derived from live ammunition, CWM or explosives that have been lost, abandoned, discarded, buried, fired or thrown from demolition pits or burning pads)” has been discovered in various areas of MMR.

vii. Until the mid-1970s, land burial of unexploded ordnance was an authorized method of disposal. According to an Army Corps of Engineers guidance document: “It was much cheaper to dig a trench and bury ammunition than it was to destroy it by burning or detonation.... It was much easier to discard unneeded ammunition into a pond or lake than fill out the required paperwork and return it to the ammunition supply point.”

viii. According to a February 1999 U.S. Army Corps of Engineers Report, “Conceptual Model and Process Descriptor Formulations for Fate and Transport of UXO,” UXO can exist on firing ranges in a number of physical states that greatly affect the fate and transport of explosives contained in the UXO. Intact delivery systems may occur at the firing range from either deliberate burial or fired munitions that failed to detonate. Explosives contamination from intact delivery systems results from corrosion and development of pinhole cracks that may occur over time or leaking through screw threads linking the fuse assembly to the main charge. Incomplete detonation or breakup of the delivery system without detonation may also occur, leading to the survival of part or all of the explosive. These explosives may be scattered over the firing range as free product or partially encased in the remains of the delivery system.

ix. According to a September 1997 U.S. Army Corps of Engineers Report, “Assessment of Sampling Error Associated with Collection and analysis of Soil Samples at a Firing Range Contaminated with HMX,” a 7 gram sample of metallic rocket debris collected at a firing range was contaminated with residues of HMX and TNT at concentrations of 50 mg/kg and 0.1 mg/.kg, respectively.

Contamination from UXO located on the surface and subsurface in the Training Ranges and Impact Area is likely to enter the underlying groundwater.

## VII. ENDANGERMENT AND RESPONSE

40. The detection of contaminants in soil and groundwater samples discussed above demonstrates the release or threat of release of contaminants from the Training Ranges and Impact Area. to the Sagamore Lens, a part of the sole source aquifer underlying Cape Cod

41. EPA has established Maximum Contaminant Level (MCLs) and Contaminant Level Goals (MCLGs) for certain contaminants in drinking water, pursuant to Section 1412 of SDWA. MCLGs are set at levels at which no known or anticipated adverse health effects would occur and with an adequate margin of safety. MCLs are set as close to MCLGs as is feasible, taking into account available treatment technologies and cost.

42. EPA has established Lifetime Health Advisories for certain contaminants. Lifetime Health Advisories establish the concentration of a chemical in drinking water that is not expected to cause any adverse non-carcinogenic effect over a lifetime of exposure with a margin of safety.

43. EPA has also established Drinking Water Equivalency Levels (DWELs). A DWEL represents the concentration of a substance in drinking water that is not expected to cause any adverse non-carcinogenic health effects in humans over a lifetime of exposure. The DWEL is calculated assuming that all exposure to the chemical comes from drinking water.

44. The Lifetime Health Advisory for RDX is 2 ppb. Consumption of large amounts of RDX by humans has caused seizures, indicating that the nervous system is a primary target organ. A 1984 Department of Defense study of female mice showed an increased incidence of liver tumors following chronic oral exposure to RDX. In its cancer classification system, EPA has classified RDX as a possible human carcinogen (Group C carcinogen).

45. The Lifetime Health Advisory for TNT is 2 ppb. Chronic exposure to TNT by humans has been associated with skin irritation and cataracts. Exposure to very high levels of TNT in the workplace has been associated with disorders of the blood and abnormal liver functions. Oral and inhalation exposures to TNT in animals have resulted in adverse effects on the blood and liver as well as the spleen and immune system. TNT has been found to cause serious effects on the male reproductive system in rats following high exposures to TNT. In a 1984 U.S. Army study, TNT was found to cause urinary bladder tumors in female Fisher rats. In its cancer classification system, EPA has classified TNT as a possible human carcinogen (Group C carcinogen).

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46. EPA has established DWELs to assess the non-carcinogenic potential for 2,4-DNT and 2,6-DNT in adults. The DWEL for 2,4-DNT is 100 ppb and the DWEL for 2,6-DNT is 40 ppb. Human exposure to 2,4 or 2,6-dinitrotoluene (DNT) in occupational settings, presumably via inhalation, may result in an increase in the death rate due to ischemic heart disease and has been associated with central nervous system effects and effects on blood. In oral exposure to high levels of 2,4-DNT or 2,6-DNT, reproductive effects have been noted in animals. Oral exposure studies in animals have also revealed effects on the blood, nervous system, liver and kidney. Both 2,4-DNT and 2,6-DNT have been found to cause liver cancer in laboratory rats of both sexes. 2,4-DNT has been found to cause kidney tumors in male mice. In its cancer classification system, EPA has classified the mixture of 2,4-DNT and 2,6-DNT as a probable human carcinogen (Group B2 carcinogen).

47. The MCLG for lead is zero. Lead is a reproductive hazard that can adversely affect the brain and central nervous system by causing encephalopathy and peripheral neuropathy. Lead exposure across a broad range of blood lead levels has been associated with a spectrum of pathophysiological effects, including interference with heme synthesis necessary for formation of red blood cells, anemia, kidney damage, impaired reproductive function, interference with vitamin D metabolism, impaired cognitive performance (as measured by IQ tests, performance in school and other means), delayed physical development, and elevations in blood pressure. Lead has the potential to bioaccumulate. This phenomenon occurs when the tissues of prey organisms (plant or animal) are passed into those of predators resulting in increased lead concentration levels orders of magnitude higher. Lead can accumulate in the tissues of many free-living wild animals, including birds, mammals, fishes and invertebrates such as worms and snails. Lead has been demonstrated to adversely affect bacteria and fungi on leaf surfaces and soil, many of which play key roles in the decomposer food chain.

48. EPA has established a Lifetime Health Advisory for HMX in drinking water of 400 ppb. Animal studies indicate that HMX may be harmful to humans and may cause liver damage and central nervous system damage if ingested or absorbed through the skin.

49. EPA has established a DWEL for dibutylphthalate (also known as di-N-butylphthalate) in drinking water of 4 ppm. Long term exposure to dibutylphthalate may result in reproductive problems and lower fertility.

50. EPA has set a Lifetime Health Advisory for N-Nitrosodiphenylamine in drinking water of 700 ppb. In its cancer classification system, EPA has classified N-Nitrosodiphenylamine as a probable human carcinogen (Group B2 carcinogen).

51. MCPP, also known as Mecoprop, is a general use pesticide. It is classified by EPA as class II toxicity, slightly toxic. MCPP is a teratogen in rats at moderate to high doses and may be mutagenic at very high doses.

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52. MCPP and its salt forms are very mobile in a variety of soils. Because of this high mobility, it may generally leach to and migrate quickly in groundwater.

53. EPA has established a MCL of 1 ppb and an MCLG of 0 for pentachlorophenol for drinking water. Short term exposure to large amounts of pentachlorophenol or long term exposure to low levels can harm the liver, kidneys, blood, lungs, nervous system, immune system and gastrointestinal tract. In its cancer classification system, EPA has classified pentachlorophenol as a probable human carcinogen (Group B2 carcinogen).

54. EPA has established a MCL for barium of 2 ppm in drinking water. Barium compounds that dissolve easily in water can cause difficulties in breathing, increased blood pressure, changes in heart rhythm, stomach irritation, brain swelling, muscle weakness and damage to the liver, kidney, heart, and spleen.

55. EPA has established a MCL for cadmium in drinking water of 5 ppb. Long term exposure to low levels of cadmium in drinking water leads to a build up of cadmium in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. The U.S. Department of Health and Human Services has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

56. EPA has established a DWEL of 150 ppb for 2A46 DNT in drinking water and a DWEL of 40 ppb for 4A26DNT in drinking water.

57. EPA has established a DWEL of 5 ppb for Nitroglycerin (Trinitroglycerol) in drinking water. Exposure to relatively small amounts of nitroglycerin can produce an intense throbbing headache, often associated with nausea and occasionally with vomiting and abdominal pain. Exposure to larger amounts may result in hypotension, depression, confusion, occasional delirium, and cyanosis.

58. EPA has established an MCL of .05 ppb and an MCLG of zero for 1,2-Dibromoethane in drinking water. 1,2-Dibromoethane may cause redness and inflammation, including skin blisters and mouth and stomach ulcers if large amounts are swallowed. In its cancer classification system, EPA has classified 1,2-dibromoethane as a probable human carcinogen (Group B2 carcinogen).

59. EPA has established a Long Term Health Advisory of 2 ppb for dieldrin in drinking water. A Long Term Health Advisory is the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to fourteen consecutive days of exposure, with a margin of safety. Dieldrin affects mainly the central nervous system. Ingestion of moderate levels of dieldrin over a long period of time may cause convulsions. In its cancer classification system, EPA has classified dieldrin as a probable human carcinogen (Group B2 carcinogen).

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60. EPA has established an MCL of 5 ppb for arsenic in drinking water. Arsenic may damage tissues including nerves, stomach and intestines, and skin. High levels of arsenic may be fatal. Low levels of arsenic may cause nausea, vomiting, diarrhea, decreased production of red and white blood cells, abnormal heart rhythm, and blood vessel damage. In its cancer classification system, EPA has classified arsenic as a human carcinogen (Group A carcinogen).

61. The presence of RDX, TNT, DNT, 2,4,6-TNT, HMX and other contaminants in groundwater and the likely release to groundwater of RDX, TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, Di-N-Butylphthalate, N-nitrosodiphenylamine, furans, dioxins, aluminum, lead, magnesium, pentachlorophenol, barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin, arsenic and other contaminants from the Training Ranges and Impact Area through a natural leaching process, may present an imminent and substantial endangerment to the health of persons.

62. The Work required under this Order is necessary to prevent, minimize, and/or mitigate the threat of an imminent and substantial endangerment to the health of persons posed by the actual or potential releases of contaminants into the soils and groundwater at and emanating from the Training Ranges and Impact Area.

## VIII. CONCLUSIONS OF LAW

Based on the foregoing, EPA makes the following conclusions of law:

63. Respondent National Guard Bureau is a "person" as that term is defined in Section 1401(12) of the SDWA, 42 U.S.C. § 300f(12).

64. Respondent Massachusetts National Guard is a "person" as that term is defined in Section 1401(12) of the SDWA, 42 U.S.C. § 300f(12).

65. The lead, RDX, TNT, DNT, 2,4,6 TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, Di-N-Butylphthalate, N-nitrosodiphenylamine, Picric Acid, furans, dioxins, aluminum, magnesium, hexachlorobenzene, di-n-butylphthalate, pentachlorophenol, barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin and arsenic found at, beneath or near the Training Ranges and Impact Area and which may leach to groundwater, are "contaminants", as that term is defined in Section 1401(6) of SDWA, 42 U.S.C. § 300f(6).

66. The lead, RDX, TNT, DNT, 2,4,6 TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, Di-N-Butylphthalate, N-nitrosodiphenylamine, Picric Acid, furans, dioxins, aluminum, magnesium, hexachlorobenzene, di-n-butylphthalate, pentachlorophenol, barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin, arsenic contained in UXO, found in the soil and/or in and the groundwater beneath or near the Training Ranges and Impact Area are present in or likely to enter the Sagamore Lens of the Cape Cod Aquifer.

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67. The Sagamore Lens is part of the Cape Cod Aquifer, an "underground source of drinking water", as that term is defined in 40 C.F.R. Section 144.3.

## IX. DETERMINATIONS

Based on the foregoing and the Administrative Record for this Site, EPA has determined that:

68. The contaminants present in or likely to enter the underground source of drinking water may present an imminent and substantial endangerment to the health of persons, within the meaning of Section 1431(a) of SDWA, 42 U.S.C. § 300i(a).

69. Respondents have caused or contributed to the endangerment described immediately above.

70. In accordance with the requirements of Section 1431 of the SDWA, EPA determines that the Commonwealth of Massachusetts and local authorities have not by themselves taken the actions necessary to protect the health of persons whose sole source of drinking water is the Sagamore Lens of the Cape Cod Aquifer. They will work in concert with EPA under this order to provide such protection.

71. The actions required by this Order are necessary to prevent further release or threat of release of contaminants and to protect the health of persons who are or may be users of the Sagamore Lens of the Cape Cod Aquifer. Based on the endangerment described above, the response actions in this Order are necessary. The response actions will consist of Respondents' implementation of the Statements of Work appended to this Order. The Statements of Work are designed to prevent, minimize, and/or mitigate damage to the health of persons which may otherwise result from the release or threat of release of contaminants.

## X. ORDER

Based on EPA's jurisdiction, Findings of Fact, Conclusions of Law set forth above, the Administrative Record supporting issuance of this Order, and in order to abate or prevent any imminent and substantial endangerment to health, the Respondents are **ORDERED** to perform all Work required under this Order. The Respondents shall comply with the following provisions and perform all actions required by the terms and conditions of this Order.

72. With respect to the following areas, Respondents must conduct the following actions, as further specified in the Statements of Work attached to this Order:

**Demolition Area 1.** Respondents shall conduct a feasibility study for remediation of soils and groundwater contamination related to Demolition Area 1 under this Order. After EPA selects an appropriate remedy based on this feasibility study and public comment, Respondents shall conduct remedial design and remedial action at Demolition Area 1 under this Order.

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**CS-19:** Groundwater and soil contamination at CS-19 is currently being addressed by the Air Force under the Installation Restoration Program (IRP). The Respondents are required to take action under this Order for the CS-19 area only if EPA determines that remediation proposed under the IRP program is not adequately protective.

**Southeast Corner of the Range:** Respondents shall conduct a feasibility study for remediation of soils and groundwater at the J Ranges. After EPA selects an appropriate remedy based on this feasibility study and public comment, Respondents shall conduct remedial design and remedial action at J Ranges area under this order. Respondents shall also conduct a rapid response action for contaminated soils at the steel lined pits.

**Central Impact Area:** Respondents shall conduct a feasibility study for groundwater contamination at and emanating from in the Central Impact Area. After EPA selects an appropriate remedy based on this feasibility study and public comment, Respondents shall conduct remedial design and remedial action for contaminated groundwater at and emanating from the Central Impact Area under this order. This Order also requires the Respondents to conduct a rapid response action for soils contaminated with 1,2-dibromoethane.

**KD Range:** Respondents shall conduct a rapid response action for contaminated soils at the firing and target positions at the KD Ranges.

**J-3 Wetland:** Respondents shall conduct a rapid response action for contaminated soils and sediments at the J-3 Wetland.

**Gun Positions:** Respondents shall conduct a rapid response action for contaminated soils at Gun Positions 7 and 16. Respondents shall take action at GP 9 if EPA determines that the remediation proposed under the IRP program is not adequately protective.

**Armored Personnel Carrier:** Respondents shall conduct a rapid response Action for contaminated soils at the Armored Personnel Carrier.

**Unexploded Ordnance in the Training Range and Impact Area:** Respondents shall conduct a feasibility study for remediation of surface and subsurface UXO. After EPA selects an appropriate remedy based on this feasibility study and public comment, Respondents shall conduct remedial design and remedial action for surface and subsurface UXO under this Order.

76. All response actions proposed by Respondents under this Order shall meet or exceed the substantive cleanup standards of M.G.L. c. 21 E and the Massachusetts Contingency Plan, 310 CMR 40.000 et seq. Nothing herein shall limit the Respondents' obligations to provide any notifications to DEP as required by M.G.L. c. 21E and the Massachusetts Contingency Plan.

77. Respondents shall conduct additional response actions as required by the Statements of Work attached to this Order, and any modifications thereto made in accordance with this Order.

**XI. DESIGNATION OF SUPERVISING CONTRACTOR AND  
PROJECT COORDINATOR**

78. Within **seven (7) days** after the effective date of this Order, the Respondents shall retain the services of a qualified and experienced Supervising Contractor for the purpose of performing the work required by this Order in accordance with the terms and conditions of the Scope of Work. Within the same **seven (7) day** period, the Respondents shall notify EPA in writing of the name, address, and qualifications of the proposed supervising contractor and the name and telephone number of the supervising contractor's primary contact person. The Respondents shall also notify EPA of the identity and qualifications of any other contractor(s) or subcontractor(s) to be used at the Site at least **seven (7) days** in advance of their performing any work under this Order.

79. The supervising contractor shall be a qualified professional with substantial expertise and experience in the investigation and cleanup of hazardous waste sites, munitions and contaminated groundwater, as well as clearance and remediation of UXO. EPA reserves the right to disapprove, based on professional qualifications, conflicts of interest, and/or deficiencies in previous similar work, any contractor or subcontractor or other person engaged directly or indirectly by the Respondents to conduct work activities under this Order. If EPA disapproves the selection of any proposed contractor, the Respondents shall notify EPA in writing of the name, address, and qualifications of another contractor within **seven (7) days** after receipt of the notice of disapproval.

80. Respondents shall provide a copy of this Order to all contractors, subcontractors, laboratories, and consultants retained in connection with this Order within **seven (7) days** after the Order's effective date or of such retention, whichever is later. The Respondents shall ensure that all such contractors, subcontractors, laboratories and consultants will perform all work in conformity with the Resource Conservation and Recovery Act, 42 U.S.C. §6901 (RCRA), SDWA, and the terms and conditions of this Order and Scope of Work. Respondents shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Work in accordance with this Order.

81. Within **seven (7) days** after the effective date of this Order, the Respondents shall designate a Project Coordinator who shall be responsible for administration of all of the Respondents' actions called for by this Order, and shall submit the designated coordinator's name, address, and telephone number to EPA. EPA will deem the project coordinator's receipt of any notice or communication from EPA relating to this Order as receipt by the Respondent.

**XII. NOTICE OF INTENT TO COMPLY**

82. Each Respondent shall provide, within **seven (7) days** after the effective date of this Order, written notice to EPA stating whether it will comply with the terms of this Order. If a Respondent



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does not unequivocally commit to perform the work required by this Order, that Respondent shall be deemed to have violated this Order and to have failed or refused to comply with this Order. The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be acceptance of Respondents' assertions.

**XIII. EPA TECHNICAL PROJECT COORDINATOR**

83. The EPA Technical Project Coordinator (TPC) will administer EPA's responsibilities and receive all written notices, reports, plans and other documents required by this Order. EPA's TPC under this Order will be Todd Borci or other EPA designee. All submissions required by this Order shall be sent to EPA's TPC at the following address:

Attention: MMR Impact Area Technical Project Coordinator

Mr. Todd Borci  
U.S. Environmental Protection Agency  
J.F.K. Federal Building  
Boston, MA 02203-2211

84. EPA's TPC shall have the authority to modify the Scope of Work in writing. Absence of the TPC from the Site shall not be cause for stoppage of work by the Respondents unless specifically directed by the TPC.

**XIV. WORK TO BE PERFORMED; COMPLETION OF WORK**

85. Immediately after EPA approval of Respondents' retention of the supervising contractor, unless modified pursuant to Section XXXVI of this Order, Modification of the SOW, the Respondents shall commence the work detailed in the Scope of Work. All work performed by the Respondents shall be conducted in accordance with SDWA, applicable guidance documents provided by EPA, and the provisions of this Order including any standards, specifications, and time schedules contained in the Scope of Work or specified by the TPC.

86. Within **forty-five (45) days** after completing all work required under this Order, the Respondents shall submit for EPA approval a Completion of Work Report summarizing the activities conducted pursuant to the Scope of Work. The Completion of Work Report shall include the categories of information and conform to the requirements specified in the Scope of Work. The Completion of Work Report shall be certified by the supervising contractor, to the effect that all response activities have been completed in full satisfaction of the requirements of this Order.

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87. When EPA determines that all work has been fully performed in accordance with this Order, and that all goals and objectives of this Order and the Scope of Work have been satisfied, EPA will provide written notice to the Respondents. If EPA determines that all response activities have not been completed in accordance with the provisions of this Order, it will so notify the Respondents and provide a list of the tasks remaining and a schedule for their completion. The Respondents shall perform all remaining tasks and shall submit an amended Completion of Work Report in accordance with the EPA notice. If EPA determines that the remaining tasks have not been completed in accordance with the provisions of the EPA notice and this Order, the Respondents shall be in violation of this Order.

88. EPA's issuance of the notice referred to in the paragraph immediately above shall not preclude it from later determining, based upon new information or otherwise, that the Respondents have not completed all response activities in accordance with the provisions of this Order.

### **XV. SUBMISSIONS REQUIRING AGENCY APPROVAL; RESPONDENTS' OBLIGATION TO PROCEED**

89. After review of any deliverable, plan, report or other item (submission) that the Respondents are required to submit for review and approval pursuant to this Order and Statements of Work, EPA may: (i) approve the submission; (ii) conditionally approve the submission with required modifications; (iii) disapprove the submission and notify the Respondents of deficiencies; or (iv) disapprove the submission and modify the deliverable, plan, report, or other item itself to cure any deficiencies. In the event EPA approves or conditionally approves the submission, or disapproves and modifies the submission itself, the Respondents shall perform all actions required by the submission, as approved, conditionally approved, or modified by EPA.

90. Upon receipt of a notice of disapproval with deficiencies ((iii) above), the Respondents shall correct the deficiencies and resubmit the submission within **seven (7) days** or such other time period specified in the notice of disapproval. Notwithstanding a notice of disapproval, the Respondents shall proceed to take any action required by any non-deficient portion of the submission. If EPA does not approve the submission as resubmitted, Respondents shall be in violation of the Order.

91. For each submission provided to EPA, the Respondents shall submit such copies as specified by the TPC. Any deliverable, plan, or report submitted to EPA pursuant to this Order shall be dated and shall include, in a prominent location in the document, the following disclaimer: "Disclaimer: This document has been prepared pursuant to a government administrative order (U.S. EPA Region I SDWA Docket No. 1-2000-0014) and is subject to approval by the U.S. Environmental Protection Agency. The opinions, findings, and conclusions expressed are those of the authors and not those of the U.S. Environmental Protection Agency." In addition, any such deliverable, plan, or report which has not received final approval from EPA shall be marked "Draft" on each page. The Respondents shall provide copies of all deliverables to the Massachusetts Department of Environmental Protection (DEP). EPA will consult with the DEP in

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its review of each major deliverable; however, EPA retains the authority to approve or disapprove any of the deliverables.

## **XVI. INCORPORATION AND ENFORCE ABILITY OF DOCUMENTS**

92. The Statements of Work and all other appendices or attachments to this Order shall be deemed incorporated into, and made an enforceable part of, this Order. Upon approval by EPA, all contracts, deliverables, plans, reports, specifications, schedules, or other items required by or developed under this Order shall be deemed incorporated into, and made an enforceable part of, this Order. In the event of conflict between this Order and any document attached to, incorporated into, or enforceable hereunder, the provisions of this Order shall control.

## **XVII. SITE ACCESS**

93. To the extent Respondents own, occupy, lease or control property at the MMR, or property other than the MMR to which access is required in order to properly carry out the terms of this Order, they shall grant access to EPA, the Commonwealth of Massachusetts (the "State") and their officers, employees, agents, contractors, consultants, and other authorized representatives for purposes of implementing and monitoring work to be performed under this Order.

94. To the extent access to, use or ownership of, or easements over property other than the MMR is required for the proper and complete implementation of this Order, the Respondents shall use best efforts to obtain site access agreements or other interests in the property, in writing, sufficient to allow implementation of this Order within **thirty (30) days** after the Order's effective date. For purposes of this paragraph, "best efforts" include but are not limited to the payment of money, consistent with the Anti-Deficiency Act, in consideration of access to property.

95. Such written access agreements or other interests obtained pursuant to the preceding paragraph shall provide EPA, the State, and their officers, employees, agents, contractors, consultants, and other authorized representatives access to the MMR or other such property at all times for purposes of implementing and monitoring work under this Order. Such written access agreements or other interests shall specify that the Respondents are not EPA's representatives or agents with respect to liability associated with the Site.

96. In the event that site access agreements or other interests sufficient for implementation and monitoring of work under this Order are not obtained within the time period specified above, the Respondents shall notify EPA in writing within **three (3) days** thereafter regarding the lack of such agreements and the efforts made by the Respondents to obtain them. Lack of access shall not excuse or justify failure to perform any activity or to meet any deadline not requiring or directly dependent upon such access.

**XVIII. QUALITY ASSURANCE/SAMPLING**

97. The Respondents shall submit immediately to EPA and the State, upon receipt, the results of all sampling or tests and all other data generated by the Respondents, their contractor(s), or on the Respondent's behalf in the course of implementing this Order. The Respondents shall also provide the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

98. Upon request, the Respondents shall allow EPA, the State, or their authorized representatives to take split and/or duplicate samples of any samples collected by the Respondents while performing work under this Order. The Respondents shall notify EPA and the State not less than four (4) days in advance of any sample collection activity. In addition, EPA shall have the right to take any additional samples that it deems necessary.

99. The Respondents shall assure that EPA and its authorized representatives are allowed access to any laboratory utilized by the Respondents in implementing this Order. Upon request, the Respondents shall have a designated laboratory analyze samples submitted by EPA for quality assurance monitoring.

**XIX. ACCESS TO INFORMATION; RECORD PRESERVATION;  
CONFIDENTIALITY CLAIMS**

100. Upon request, the Respondents shall provide EPA with copies of all records, documents, and other information generated by the Respondents and their contractor(s) which relates in any way to the facility or to the implementation of this Order, including but not limited to, sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs, manifests, receipts, reports, and correspondence. In addition, the Respondents' employees, agents, or representatives with knowledge of facts concerning the conditions at the facility or performance of work under this Order shall be made available to EPA to provide such information.

101. For a period of at least five (5) years following completion of all work conducted by the Respondents pursuant to this Order, the Respondents shall preserve all documents, records, and information of whatever kind, nature or description in their possession and/or control or that of their officers, employees, agents, licensees, accountants, contractors, attorneys, successors and assigns, that relate in any way to the performance of work under this Order, or relate in any way to releases or threatened releases of contaminants which are the subject of the actions addressed by this Order. After this five (5) year period has expired, the Respondents shall provide EPA with thirty (30) days advance written notice prior to the destruction of any such records, documents, or information. The Respondents shall send such notice, accompanied by a copy of this Order, to:

Attention: MMR Impact Area Counsel  
Office of Environmental Stewardship

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U.S. Environmental Protection Agency

J.F.K. Federal Building

Boston, Massachusetts 02203-2211

Re: Response Action at Massachusetts Military  
Reservation

EPA Docket No. SDWA-1-2000-0014

Upon request, the Respondents shall provide to EPA copies of all such records, documents, or information.

102. Respondents may assert a confidentiality claim, if appropriate, covering part or all of the information required by or requested under this Order, pursuant to Section 1445(d)(1) of SDWA, 42 U.S.C. § 300j-4(d)(91) and 40 C.F.R. § 2.203(b) (1989). Respondents shall adequately substantiate all such assertions. Information determined to be confidential by EPA will be afforded the protection required by 40 C.F.R. Part 2, Subpart B. If no confidentiality claim accompanies the information when submitted to EPA, EPA may make it available to the public without further notice to the Respondents. However, pursuant to Section 1445(d)(2) of SDWA, 42 U.S.C. § 300j-4(d)(2), any information shall be disclosed to the public to the extent that it deals with the level of contaminants in drinking water.

**XX. CREATION OF DANGER; EMERGENCY RESPONSE**

103. Upon the occurrence of any incident or change of conditions during the activities conducted pursuant to this Order that causes or threatens a release of contaminants from the facility or an endangerment to the public health or welfare or the environment, the Respondents shall immediately take all appropriate action to prevent, abate or minimize such release or endangerment. The Respondents shall also immediately notify the TPC or, in the event of his/her unavailability, shall notify the Regional Duty Officer of the Emergency Planning and Response Branch, EPA Region I, telephone (800) 424-8802. In taking any actions under this paragraph, the Respondents shall act in accordance with all applicable provisions of the Health and Safety Plan prepared pursuant to the Statements of Work.

104. The Respondents shall submit a written report to EPA within **seven (7) days** after each incident specified above, setting forth the events that occurred and the measures taken and to be taken to mitigate any release or endangerment caused or threatened by the incident and to prevent the reoccurrence of such an incident.

105. Nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to

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prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the facility.

### **XXI. AMENDMENTS**

106. This Order, other than the Statements of Work, may only be amended in writing by signature of the Regional Administrator of EPA Region I. Amendments or modifications to the Statements of Work may only be made in writing by the TPC.

107. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by the Respondents shall be construed as relieving the Respondents of their obligation to obtain such formal approval as may be required by this Order.

### **XXII. PUBLIC INVOLVEMENT**

108. Respondents shall ensure adequate public involvement in all Work undertaken pursuant to the Order and SOW. Within fifteen days of the effective date of the Order, Respondents shall submit to EPA a plan for ensuring adequate public involvement, including but not limited to the following:

- A. Making immediately available to the public all non-privileged information obtained or compiled pursuant to this Order;
- B. Coordinating the Work under this Order and SOW with the Impact Area Review Team established pursuant to Administrative Order I-97-1019 and providing resources for the effective functioning of the Impact Area Review Team;
- C. Providing periodic oral and written updates to the public on the progress of the Work;
- D. Sharing immediately with the public all conclusions reached by the Respondents or their representatives with respect to the Work;
- E. Coordinating the Work under this Order and SOWs with the ongoing groundwater investigations being undertaken by Respondents and with response actions being undertaken at MMR by the Installation Restoration Program.

### **XXIII. COOPERATIVE MANAGEMENT OF ACTIVITIES**

109. EPA intends to implement a fully collaborative and cooperative approach to management of Rapid Response actions and response actions under this Order. Toward that end, EPA intends to establish a three-level management structure to oversee these actions. These Management Groups

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are to meet regularly to review progress and anticipate and minimize problems with the response actions:

a.. The first management level will be a Project Management Group consisting of the EPA Technical Project Coordinator, the Massachusetts DEP Project Manager, and the NGB Project Manager. This group shall attempt to meet on a weekly basis to discuss implementation of this Order.

b. The second management level will be a Senior Management Group consisting of the Senior Policy Advisor for EPA New England, the Deputy Regional Director of Waste Site Cleanup for Massachusetts, and the Chief, Environmental Programs Division, Army National Guard. This group shall meet periodically to discuss implementation of this Order.

c. The third management level will be an Executive Board consisting of the EPA Regional Administrator, the Massachusetts DEP Commissioner and Deputy Assistant Secretary of Army for Environment, Safety and Occupational Health. This group shall meet as needed to review overall progress under this Order.

d. In addition, on a monthly basis, more or less, issues shall be discussed with the Impact Area Review Team to receive input on key decisions.

## **XXIV. DISPUTE RESOLUTION**

110. The dispute resolution procedures herein will apply to disputes regarding implementation of the requirements of this Order.

a. Respondents shall make reasonable efforts to resolve disputes informally at the Project Management and Senior Management levels. If resolution cannot be reached informally, then the procedures below shall be implemented to resolve a dispute.

b. During this informal dispute resolution period, EPA and the Respondents shall confer as many times as may be necessary to discuss and attempt resolution of the dispute, and shall involve the public as appropriate.

c. Within seven days after any party concludes that agreement cannot be reached through informal dispute resolution, the Respondent(s) shall submit to EPA a written statement of dispute, setting forth the nature of the dispute, the work affected by the dispute, the Respondent's position with respect to the dispute, and the technical or factual information the Respondent(s) is relying upon to support its position. The parties shall have seven days to reach agreement or the matter shall be referred to the Executive Board.

d. The Executive Board shall attempt to resolve disputes for which agreement has not been reached within 21 days of having a dispute referred to it. The Executive Board members shall, as

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appropriate, confer, solicit public involvement, and exert their best efforts to resolve the dispute and issue a unanimous written decision signed by the parties to the dispute. If the Board members are able to unanimously resolve the dispute, they shall memorialize their agreement in writing. If unanimous resolution is not reached, EPA's Regional Administrator shall use best efforts to issue a written decision within 14 days from the date on which the dispute was forwarded to the Executive Board but may issue a written decision in a longer time frame if considered necessary by the EPA Regional Administrator based on the particular circumstances of the dispute. No further review of the dispute is available.

e. This dispute resolution process shall not be construed to limit the right of any party to seek review and resolution of national security issues through existing processes as may be provided by Executive Order 12088.

f. The review of any dispute under these procedures shall not affect Respondents' responsibility for timely performance of the Work required by this Order, except that the time period for completion of work affected by such dispute shall be extended for a period of time usually not to exceed the actual time taken to resolve any good faith dispute in accordance with the procedures as specified herein. Whether a dispute has been made in good faith shall be determined by EPA. All elements of the work required by the Order, as determined by EPA, which are not affected by the dispute, shall continue to be completed in accordance with the applicable schedule.

g. EPA anticipates that Work affected by the dispute will continue during the dispute resolution process, with the time period for completion of the Work extended as set out in the previous paragraph. However, while dispute resolution is in progress, performance of specific elements of the Work affected by the dispute will be suspended if either EPA or the Respondent(s) requests, in writing, that such work element be suspended because (1) performing such work element will make the dispute moot, or (2) because such work element is inadequate or defective and such inadequacy or defect may result in an adverse effect on human health, welfare or the environment. Notwithstanding any other provision of this agreement, however, any element of Work that has been stopped pursuant to the previous sentence shall be immediately recommenced, if EPA determines that the stoppage, either by itself or in conjunction with other events, may present an imminent and substantial endangerment to human health and the environment.

h. After stoppage of Work as set out in the prior sub-paragraph, EPA and Respondents shall meet to discuss the stoppage. Following this meeting, and further consideration of the issues, EPA will issue a written opinion with respect to the Work stoppage if the dispute continues. In any event, any element of the Work that has been stopped under this paragraph shall be immediately resumed upon issuance and in accordance with the Regional Administrator's written decision on the underlying dispute, as provided in sub-paragraph d.

i. Within the time frame established in the resolution of a dispute pursuant to this provision, Respondents shall incorporate the resolution and final determination into the appropriate plan,



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timetable or procedures, and complete the Work according to such amended plan, timetable or procedure.

**XXV. OTHER APPLICABLE LAWS**

111. All actions required pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations, including but not limited to, the laws relating to occupational health and safety and worker's compensation.

**XXVI. ENFORCEMENT; PENALTIES FOR NONCOMPLIANCE**

112. Violation of this Order, or failure or refusal to comply with this Order, may subject the Respondents National Guard Bureau and Massachusetts National Guard to an enforcement action by EPA for civil penalties of up to fifteen thousand dollars (\$15,000) for each day in which such violation or failure to comply occurs, as provided in Section 1431(b) of SDWA, 42 U.S.C.300i(b) and Section 1447(b) of SDWA, 42 U.S.C. § 300j-6(b).

**XXVII. DISCLAIMER OF LIABILITY BY EPA**

113. By issuance of this Order, EPA assumes no liability for injuries or damages to persons or property resulting from acts or omissions by the Respondents, their officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out activities pursuant to this Order. EPA shall not be held as a party to any contract entered into by the Respondents or their employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

**XXIX. NO RELEASE FROM LIABILITY**

114. Nothing in this Order shall constitute or be construed as a satisfaction or release from any claim, cause of action, or demand in law or equity against the Respondents or any other person, whether or not a party to this Order, for any liability such person may have for any conditions or claims arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from the facility, including but not limited to any and all claims of the United States for money damages and interest under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), or under any other applicable statute or the common law.

**XXX. RESERVATION OF RIGHTS BY EPA**

115. EPA reserves all rights against the Respondents and all other persons to take any further civil, criminal, or administrative enforcement action pursuant to any available legal authority, including the right to seek injunctive relief; the recovery of money expended or to be expended (plus interest); monetary penalties; criminal sanctions; and/or punitive damages regarding: (i) any

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violation of this Order; or (ii) any actual or potential threat to human health or welfare or the environment, or any release or threat of release of hazardous substances on, at, in, or near the facility. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or additional actions as EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to RCRA, SDWA, or any other applicable law.

116. EPA further expressly reserves the right both to disapprove work performed by the Respondents and to request or order the Respondents to perform tasks in addition to those detailed in the Order. In addition, EPA reserves all rights it may have to undertake response actions at any time and to perform any and all portions of the work activities which the Respondents has failed or refused to perform properly or promptly, and to seek reimbursement from Respondents for its costs, or seek any other appropriate relief.

117. Notwithstanding any other provision of this Order, EPA shall retain all of its information gathering, entry, inspection, and enforcement authorities and rights under any applicable law, regulation, or permit.

**XXX.. OPPORTUNITY TO CONFER**

118. Within **three (3) days** after signature of the EPA Regional Administrator on this Order, the Respondent(s) may request a conference with the Regional Administrator of EPA Region I or his designee to be held no later than **six (6) days** after issuance of this Order. Requests for a conference should be submitted to:

William Walsh-Rogalski, Esq. (RAA)  
Office of the Regional Administrator  
U.S. Environmental Protection Agency  
1 Congress Street, Suite 100  
Boston, Massachusetts 02203-2211  
(617) 918-1035  
FAX (617) 918-1029

119. The purpose and scope of the conference shall be to discuss the issue(s) which Respondent(s) would like the Regional Administrator to consider in connection with this Order. Respondent(s) should submit copies of all necessary information regarding the issue(s) to be discussed. The conference is not an evidentiary or adversarial hearing and is not part of any proceeding to enforce or challenge the Order. At any conference held pursuant to this section, the Respondent(s) may appear in person or by attorney or other representative.

**XXXI. EXCUSED DELAY - FORCE MAJEURE**

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120. Respondents' activities under this Order shall be performed within the time limits set forth herein, or otherwise established or approved by EPA, unless performance is delayed or prevented by events which constitute "force majeure". For purposes of this Order, "force majeure" is defined as any event arising from causes beyond Respondents' control. "Force majeure" shall not include any inability of any Respondent(s) to pay the costs or expenses associated with complying with this Order, or increases in such costs or expenses, except as provided below in Section XXX, Anti-Deficiency Act. When an event constituting "force majeure" occurs, Respondents shall perform the affected activities within a time period not to exceed the time provided in this Order and the period of delay attributable to "force majeure". Respondents shall use best efforts to avoid or minimize any delay or prevention of performance of their obligations under this Order, and to discover and keep apprized of any and all circumstances which may result in a delay or prevention of the work required under this Order. A delay caused by EPA, and otherwise conforming with the terms of this Section, shall be treated as beyond the Respondents' control.

121. Respondents shall verbally notify the EPA Project Coordinator as soon as possible, and not later than forty-eight (48) hours, after the discovering that circumstances have occurred or are likely to occur which may delay or prevent the performance of any activity required by this Order, regardless of whether or not those circumstances constitute a "force majeure". If the Project Coordinator cannot be reached, Respondents shall leave a telephone message at the Project Coordinator's office. Respondents shall also notify EPA in writing within seven (7) days after the date any Respondent first became aware of the circumstances which may delay or prevent any performance of any activity required by this Order. Such written notice shall be accompanied by all available pertinent documentation including, but not limited to, third-party correspondence, and shall contain: 1) a description of the circumstances and the Respondents' rationale for interpreting such circumstances as being beyond its control; 2) the actions (including pertinent dates) Respondents have taken and/or intend to take to minimize any delay; and, 3) the date or time period Respondents propose to complete the delayed activities. Such notification shall not in and of itself relieve Respondents of any of their obligations under this Order. Respondents' failure to timely and properly notify EPA as required by this paragraph shall nullify any claim of "force majeure" and resulting entitlement to any extension of time therefor. Respondents shall have the burden of proving to EPA's satisfaction that an event constituting "force majeure" has occurred.

### **XXXII. EFFECTIVE DATE; COMPUTATION OF TIME**

122. The obligations required by this Order shall become effective pursuant to the Safe Drinking Water Act seven days after the Order is signed by the EPA Regional Administrator, consistent with the opportunity to confer described above. All times for Performance of Work under this Order shall be calculated from the effective date. When computing any period of time under this Order, if the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the next working day.

### **XXXIII. ANTI-DEFICIENCY ACT**

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123. Nothing in this Order shall require the Respondent National Guard Bureau or other federal agency to violate the Anti-Deficiency Act.

**XXXIV. SEVERABILITY**

124. If a court issues an order that invalidates any provision of this Order, or finds the Respondent(s) have sufficient cause not to comply with one or more provisions of this Order, Respondent(s) shall remain bound to comply with all provisions of this Order not invalidated by such court's order. If a court issues an order requiring that either Respondent is not a proper Respondent under this Order, the remaining Respondent shall remain bound to comply with all provisions of this Order not invalidated by such court's order.

**XXXV. TERMINATION**

125. The provisions of this Order shall remain in full force and effect until all actions required by this Order have been completed and EPA has notified the Respondents, in writing, that the actions required by this Order have been completed. Respondents shall notify EPA in writing at such time as they believe that all such actions have been completed. EPA shall have sole discretion in determining whether all such actions have in fact been completed. Failure to complete all actions required hereunder as directed by EPA shall be deemed a violation of this Order. EPA's provision of written notice to Respondents pursuant to this paragraph shall not be construed as a waiver of any of EPA's rights to take further enforcement action under any environmental laws.

**XXXVI. EXISTING CONSENT DECREE**

126. The provisions of this Order are not intended to require any action inconsistent with applicable law or with the consent decree in Conservation Law Foundation of New England, Inc. v. Lt. Gen. Herbert R. Temple, Jr. as he is Chief of the National Guard Bureau, et al., No. 86-1044-S (D. Mass). To the extent that Respondents believe in good faith that any action required by this Order would be inconsistent with that Consent Decree, Respondents are to notify EPA immediately.

**XXXVII. MODIFICATION OF THE SOW**

127. If EPA determines that modification of the Work specified in the attached SOW or in work plans developed pursuant to the SOW is necessary and appropriate, EPA may require that such modification be included in the SOW and/or in such work plans.

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IT IS SO ORDERED

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John P. DeVillars  
Administrator, EPA-New England  
U.S. Environmental Protection Agency

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Date